

AMENDMENTS TO THE DRAWINGS

The attached sheets of drawings include changes to Figures 2a, 2b and 4.

These sheets, which include Figures. 2a, 2b and 4, replace the corresponding previously presented sheets.

Attachment: Replacement Sheets
Annotated Sheets Showing Changes

REMARKS/ARGUMENTS

Reconsideration and withdrawal of the rejections of the application are respectfully requested in view of the amendments and remarks herewith, which place the application into condition for allowance. The present amendment is being made to facilitate prosecution of the application.

I. STATUS OF THE CLAIMS AND FORMAL MATTERS

Claims 1-10 are pending in this application. Claims 1 and 8 are independent. Claims 1, 3, 4 and 6-10 which are amended, hereby obviate the objections to the claims. No new matter has been introduced by this amendment. Support for this amendment is provided throughout the Specification, specifically at pages 3-6. Changes to claims are not made for the purpose of patentability within the meaning of 35 U.S.C. §101, §102, §103, or §112. Rather, these changes are made simply for clarification and to round out the scope of protection to which Applicant is entitled.

In the Drawings, figures 2a, 2b and 4 have been amended, thereby, obviating the objections. Figure 9 was objected to as requiring clarification. Page 10, lines 21-26 of the Specification provides the proper clarification disclosing $t(k)$ as the input signal to the circuit.

Reconsideration and withdrawal of the Drawing objections are respectfully requested.

The Specification has been amended, thereby, obviating the objections to the disclosure.

II. REJECTIONS UNDER 35 U.S.C. §112

Claims 3-6 were rejected under 35 U.S.C. §112, first paragraph.

Applicant submits that claims 3-6 as amended, are in full compliance with 35 U.S.C. §112, first paragraph.

Applicant notes that the Office Action states that with regard to claim 5 and 6, the specification does not describe the recited limitations in the respective claims. Applicant respectfully traverses this rejection as on page 13, line 26 - page 14, line 9 of the specification, it clearly describes at least one multiplier comprising registers, adders and subtracters.

Claims 1-7 were rejected under 35 U.S.C. §112, second paragraph.

Applicant submits that claims 1-7 as amended, are in full compliance with 35 U.S.C. §112, second paragraph.

Applicant notes that the Office Action states that in claim 1, it is unclear as to what is meant by “said polyphase filter increases a number of Intermediate Frequencies (IF) utilized in selecting the sampling frequency.” Applicant respectfully submits that the amendment to claim 1 makes clear each of the further limitations of these claims, further specified on page 3, lines 6-10 of the specification.

Reconsideration and withdrawal of 35 U.S.C. § 112, first and second paragraph rejections are respectfully requested.

III. REJECTIONS UNDER 35 U.S.C. §103(a)

Claims 1-4 and 7 were rejected under 35 U.S.C. §103(a) as being unpatentable over “High Resolution Data Conversion via Sigma-Delta Modulators and Polyphase Filters: A

Review” to Kale et al. (hereinafter, merely “Kale”) in view of GB-2282303-A to Bolle, Michael (hereinafter, merely “Bolle”).

Claim 1 recites, *inter alia*:

“A polyphase filter...

a structure of an allpass filter of order x comprising delay elements with a delay of N and at least one multiplier, wherein delay elements with a delay of N decrease a sampling rate of each of the N branch allpass filters of order $x \cdot N$,

wherein the sampling rate $f_s' = f_s/N$, with f_s being the sampling rate of the input signal, for each of the N branch allpass filters of order $x \cdot N$, where x is an integer number and N is a decimation factor of the polyphase filter; and

wherein said polyphase filter increases a number of Intermediate Frequencies (IF) utilized in selecting the sampling rate.”
(emphasis added)

As understood by Applicant, Kale relates to the Sigma-Delta approach in conjunction with digital decimation filtering techniques, focusing on single-loop single-bit higher-order modulators coupled with allpass polyphase multistage decimation filters which yield high-fidelity data converts for narrowband signals. A basic IIR allpass filter in a polyphase two-path configuration, with the appropriate delay in one of the branches, yields very high-performance and economically realizable half-band filters.

As understood by Applicant, Bolle relates to a process for digital generation of a complex baseband signal from a real, sampled baseband signal. The real baseband signal is sampled at a first clock frequency and converted into a series of digital numbers with the aid of an A/D converter. The digital numbers are fed to the all-pass filters of a recursive polyphase filter where a digital number is filtered by each all-pass filter in each cycle of a second clock frequency. After filtering, the digital numbers are multiplied in the processor and then added to obtain in-phase and quadrature components of the real baseband signal.

It is respectfully submitted that the applied combination of Kale and Bolle does not teach the above-recited features of independent claim 1. Specifically, the Office Action concedes that “Kale fails to teach the allpass filter operating at the rate of f_s/N ...”. (See Office Action page 8) Applicant respectfully disagrees with the assertion that Bolle provides the disclosure missing from Kale.

The Office Action cites page 5, lines 12-14 of Bolle, which recites “...a polyphase filter that is constructed from a number N of filters connected in parallel.”

Applicant submits that Kale and Bolle, taken alone or in combination, fail to teach or suggest the features of claim 1. Specifically, Applicant submits that there is no teaching or suggestion of the sampling rate $f_{S'} = f_s/N$, with f_s being the sampling rate of the input signal, for each of the N branch allpass filters of order $x \cdot N$, where x is an integer number and N is a decimation factor of the polyphase filter, as recited in claim 1.

Furthermore, it is respectfully submitted that the applied combination of Kale and Bolle does not teach the above-recited features of independent claim 1. Specifically, the Office Action concedes that “Kale et al. in view of Bolle does not explicitly teach increasing a number of Intermediate Frequencies utilized in selecting the sampling frequency” (See Office Action pages 8-9) Applicant respectfully disagrees with the assertion that Bolle provides the disclosure missing from Kale.

The Office Action cites page 3, lines 1-3 of Bolle, which recites “Designing the polyphase filter with all-pass filters is an advantage since all-pass filters are well suited to this type of signal processing.”

Applicant submits that Kale and Bolle, taken alone or in combination, fail to teach or suggest the features of claim 1. Specifically, Applicant submits that there is no teaching or

suggestion of the polyphase filter increasing a number of Intermediate Frequencies (IF) utilized in selecting the sampling rate, as recited in claim 1.

Therefore, Applicant submits that independent claim 1 is patentable.

For reasons similar to those described above with regard to independent claim 1, independent claim 8 is also believed to be patentable.

Therefore, Applicant submits that independent claims 1 and 8 are patentable.

IV. DEPENDENT CLAIMS

The other claims in this application are each dependent from the independent claim discussed above and are therefore believed patentable for at least the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

CONCLUSION

In the event the Examiner disagrees with any of statements appearing above with respect to the disclosure in the cited reference, or references, it is respectfully requested that the Examiner specifically indicate those portions of the reference, or references, providing the basis for a contrary view.

Please charge any additional fees that may be needed, and credit any overpayment, to our Deposit Account No. 50-0320.

In view of the foregoing amendments and remarks, it is believed that all of the claims in this application are patentable and Applicant respectfully requests early passage to issue of the present application.

Respectfully submitted,

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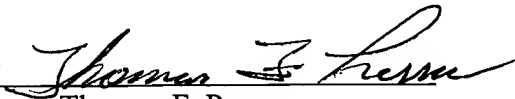
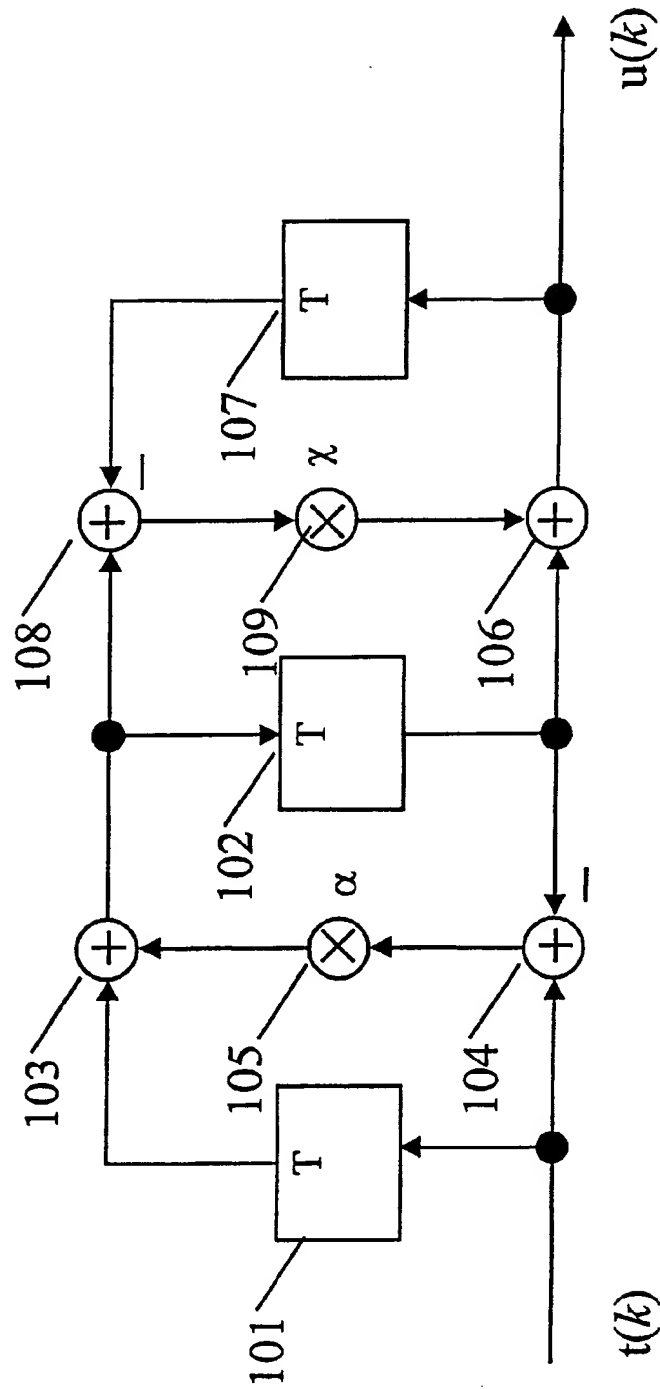
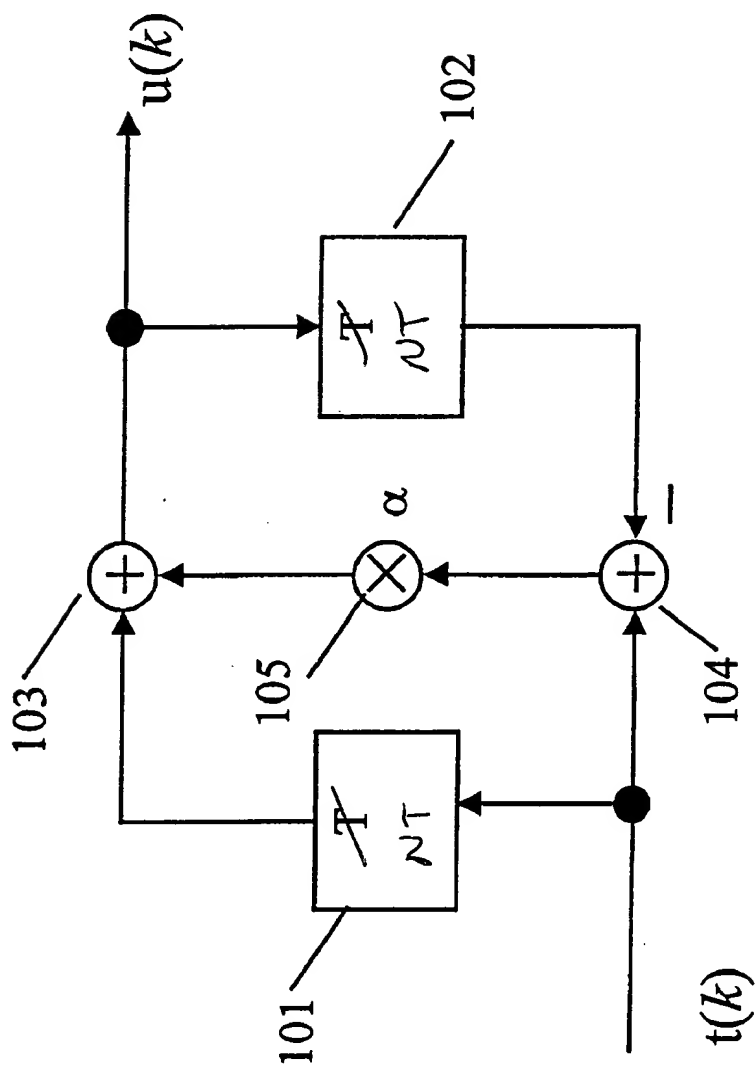
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Figure 4 Related Art



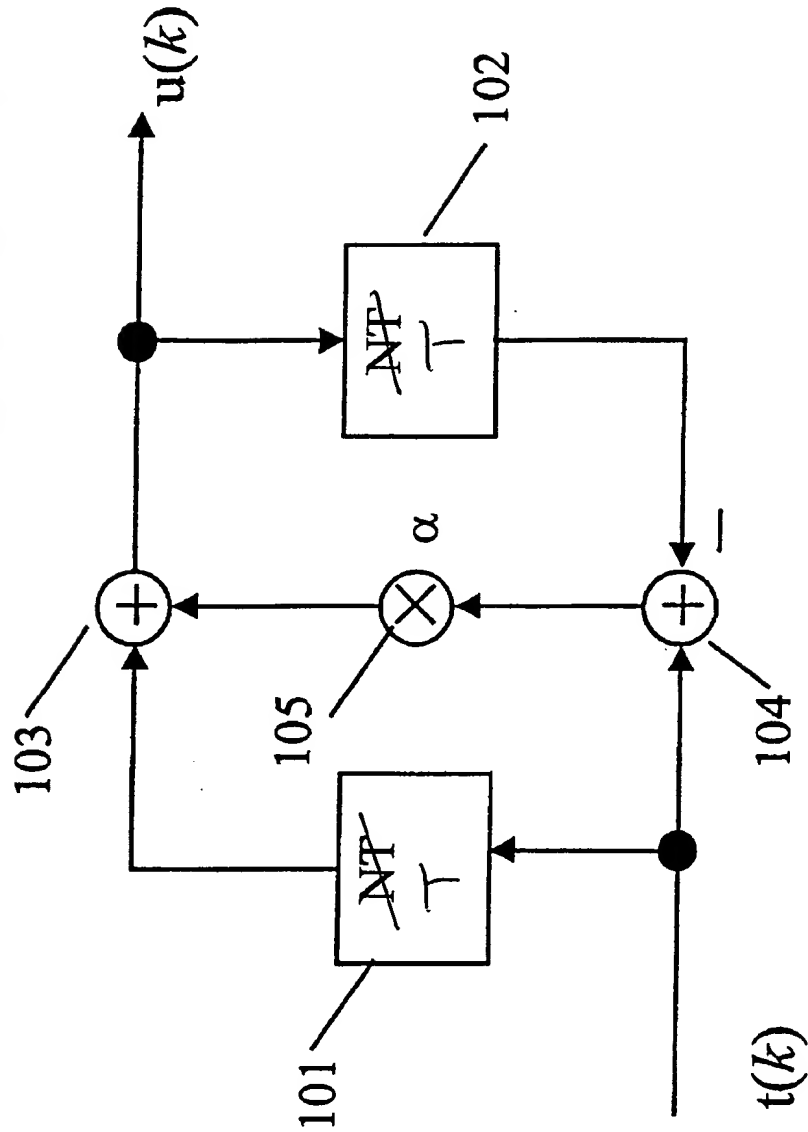
~~Revised~~ Sheet
Annotated

Figure 2b



~~Revised Sheet~~
Annotated

Figure 2a Related Art



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